

What is claimed is:

1. A rotation angle detecting device for a rotary object comprising:

a rotor connected to the rotary object and including a yoke and a pair of permanent magnets fixed to said yoke at portions thereof opposite to each other with respect to a rotation axis thereof, said pair of permanent magnets being magnetized in radial directions to be different in polarity from each other; and

a magnetic detector, disposed at the rotation axis of the rotation object, for detecting magnetic flux density of the magnetic flux;

wherein at least one of said pair of permanent magnets has a circumferentially extending rut-shape concavity around said magnet detector to make magnetic flux density in the vicinity of said magnetic detector constant in an axial direction parallel with the center axis.

2. A rotation angle detecting device for a rotary object comprising:

a rotor connected to the rotary object and including a cylindrical yoke and a pair of permanent magnets fixed to said yoke at portions thereof opposite to each other, said pair of permanent magnets being magnetized in radial directions to be different in polarity from each other; and

a magnetic detector, disposed at a rotation axis of the rotor for detecting magnetic flux density of the magnetic flux;

wherein at least one of said pair of permanent magnets has an axially extending elliptic columnar surface having a central portion thicker

than others to make magnetic flux density constant in the vicinity of said magnetic detector in a direction in parallel with the diametrically extending axis.

3. A rotation angle detecting device for a rotary object comprising:  
a rotor connected to the rotary object and including a yoke having a pair of flat surfaces opposing to each other with respect to a rotation axis of said rotor and a pair of permanent magnets respectively fixed to said flat surfaces, said pair of permanent magnets being magnetized in radial directions to be different in polarity from each other; and

a magnetic detector, disposed at a position on the rotation axis, for detecting magnetic flux density of the magnetic flux;

wherein at least one of said pair of permanent magnets has a circumferentially central portion thinner than others to make magnetic flux density constant in the vicinity of said magnetic detector in a direction in parallel with the diametrically extending axis.

4. The rotation angle detecting device according to claim 2,  
wherein at least one of said pair of permanent magnets has a circumferentially extending rut-shape concavity at a surface thereof around said magnet detector to make magnetic flux density in the vicinity of said magnetic detector constant in a direction parallel with the center axis.

5. The rotation angle detecting device according to claim 3,  
wherein at least one of said pair of permanent magnets has a

circumferentially extending rut-shape concavity at a surface thereof around said magnet detector to make magnetic flux density in the vicinity of said magnetic detector constant in a direction parallel with the center axis.

6. The rotation angle detecting device according to claim 1, wherein each of said pair of permanent magnets has a semi-cylindrical inner and outer surface extending in the axial direction.

7. The rotation angle detecting device according to claim 1, wherein each of said pair of permanent magnets comprises a plurality of magnet pieces aligned in a circumferential direction.

8. The rotation angle detecting device according to claim 1, wherein each of said pair of permanent magnets extends in parallel to each other in both axial and diametrical directions.

9. The rotation angle detecting device according to claim 1, wherein the rut-shape concavity is disposed at the center of said permanent magnets in its axial direction.

10. The rotation angle detecting device according to claim 9, wherein said permanent magnets are flat except the rut-shape concavity.

11. The rotation angle detecting device according to claim 2, the elliptic columnar surface is disposed at a radially inner surface of said

permanent magnets.

12. The rotation angle detecting device according to claim 1,  
wherein the rut-shape concavity is disposed at a radially inner  
surface of said pair of permanent magnets.

13. The rotation angle detecting device according to claim 1,  
wherein the rut-shape concavity is disposed at a radially outer  
surface of said pair of permanent magnets.

14. The rotation angle detecting device according to claim 11,  
wherein the elliptical columnar surface has a surface of a  
multidimensional curve.

15. The rotation angle detecting device according to claim 12,  
wherein the rut-shape concavity has a surface of a  
multidimensional curve.

16. The rotation angle detecting device according to claim 2, the  
elliptic columnar surface is disposed at both the radially inner and outer  
surfaces of said permanent magnets.

17. The rotation angle detecting device according to claim 16,  
wherein the elliptical columnar surface is asymmetric with respect  
to the circumferential center line of said permanent magnets.

18. The rotation angle detecting device according to claim 2,

wherein different columnar surfaces are respectively disposed at the radially inner and outer surfaces of said permanent magnets.

19. The rotation angle detecting device according to claim 15,  
wherein the rut-shape concavity has multidimensional curved surfaces which are asymmetric with respect to the axial center line of said permanent magnets.

20. A rotation angle detecting device for a rotary object comprising:

a rotor fixed to the rotary object and including a yoke and a pair of permanent magnets fixed to said yoke at portions thereof opposite to each other with respect to a rotation axis thereof, said pair of permanent magnets being magnetized in radial directions to be different in polarity from each other; and

a magnetic detector, disposed at the rotation axis of the rotation object, for detecting magnetic flux density of the magnetic flux;

wherein at least one of said pair of permanent magnets has a concavity for providing even magnetic flux density at a portion around said magnetic detector.

21. A rotation angle detecting device for a rotary object comprising:

a rotor fixed to the rotary object and including a permanent magnet being magnetized in a radial direction; and

a magnetic detector, disposed at the rotation axis of the rotation object, for detecting magnetic flux density;

wherein said permanent magnet has a concave surface formed at

the central portion thereof to supply magnetic flux of even magnetic flux density to a portion around said magnetic detector.

22. The rotation angle detecting device according to claim 21,  
wherein said permanent magnet has a circumferentially extending  
rut-shape concavity.

23. The rotation angle detecting device according to claim 22,  
wherein said permanent magnet further has an axially extending  
elliptic columnar surface.

24. A rotation angle detecting device for a rotary object  
comprising:

a rotor fixed to the rotary object and including a magnetic member  
for supplying magnetic flux; and

a magnetic detector, disposed at the rotation axis of the rotation  
object, for detecting magnetic flux density;

wherein said magnetic member has a concave surface formed at  
the central portion thereof to supply magnetic flux of even magnetic flux  
density to a portion around said magnetic detector.